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SPECIFICATION AMENDMENTS

Page 1, lines 3-10:

~~Figure 1 is a diagram which illustrates the way in which conventional broadband transmission media area used, showing how high compression and interlaced video are poor choices for higher quality applications. Interlaced video, whether NTSC or PAL, is inferior for Internet and broadband applications, since the delivered video quality is less than that possible with progressive display, regardless of compression. Even using a progressive format, however, film (35-mm) and high-end 24 fps progressive camera inputs are deficient in terms of quality, due to the need for high levels of compression later in the signal transmission path.~~

Page 4, line 21, insert the following paragraph:

Figure 1 is a diagram which illustrates the way in which conventional broadband transmission media area used. Progressive-scan devices are indicated at 102, and include 35 mm film 106, 24 frame-per-second (fps) cameras 108, and the inventive 24P camera system 110 described in further detail herein. Film production and television production are indicated with the vertical box 112, and Internet/ broadband applications are shown at 120. Interlace scan devices 114 include 30 fps NTSC 116 and 25 fps PAL 118. Although suitable for certain film and television production applications, interlaced video 114, whether NTSC 116 or PAL 118, is inferior for Internet and broadband applications 120, since the delivered video quality is less than that possible with progressive display, regardless of compression. Even using a progressive format, however, film (35-mm) 106 and high-end 24 fps progressive camera inputs 108 are deficient in terms of quality, due to the need for high levels of compression later in the signal transmission path.

Page 4, lines 21-27:

~~Referring back to Figure 1, the~~ The "Direct Stream Cinema System" preferably utilizes a 24 fps progressive camera format which, through the use of proprietary multi-format production techniques (110), facilitates Internet and broadband applications, including streaming services 122, Internet TV, video monitoring/security 124, and 35 mm/HDTV/DVD output capabilities 126. The approach does not

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require an HDTV quality video camera or recording, however, but nevertheless facilitates HDTV quality, direct video monitoring, off-line editing, and other capabilities at a great reduction in total system cost.

Page 5, lines 19-29:

Figure 2 discloses three of the many potential implementations of the "Direct Stream Cinema" system: Professional cameras and Camcorders 210, Consumer Camcorders 212, and Digital-Still-Camera recorders 214. According to the invention, the entire process 202 may use digital component (4:2:2) processing, preferably based upon a 3-CCD 24P input 204, through graphic processing and compression at 206, to storage 208, whether on a hard drive, digital video disk, memory card, or other medium. Video stored in this manner is suitable for on-line editing applications, using PC plug-in hardware cards from companies like Matrox (Perphelia) and ATI (Radion 9200/9800), Nvidia (GeForce FX). However, these conventional off-the-shelf-types of cards require modification, so that they would be equipped with true DV or SDI digital video outputs, thereby providing compatibility with both HDTV and standard NTSC formats, including analog, Y-C component formats, and composite video outputs. In addition, software packages such as Adobe Premier 6.5, and Ulead MediaStudio 7, when utilized with a high-end PC (3 GHz or higher processing speed), are capable of providing sophisticated editing capabilities.

Page 7, lines 1-8:

Figure [[23]] 3 is a diagram which illustrates a particular configuration constructed in accordance with the invention, namely, a video surveillance system. In this case, the signals from multiple cameras 302 are transmitted as streaming sources at relatively low data rates, on the order of 200K to 4 Mbps, with 1 to 24 fps variable frame rates via broadband connection 310. As discussed above, this conserves video server 312 storage requirements, facilitating one hour of storage utilizing only 2 GB of capacity. This information may then be network-accessed by one or more monitoring control systems 314, preferably using multi-screen displays, and optionally including alarms or other features using graphic analysis or other methodologies.

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Page 8, line 9 insert the following paragraph:

The advantages of this approach are many, in addition to the ability to use existing broadband infrastructures supporting data transfers in the range 1:4 Mbps, the systems may be built at 1/10th cost of conventional HDTV systems. High-quality monitoring is capable, as is direct network connectivity. The use of a generic PC-based server can easily handle a large monitoring application. The resulting configuration improves security, at banks, for example, while reducing mistakes due to human error. Operating efficiency is improved for medical applications, for example, along with reliability and monitoring efficiency (speed). Overall, the system is physically compact.

Page 8, lines 9-27:

Figure 4 is a drawing which shows a different particular layout according to the invention, in this case a streaming production system which may be implemented with Professional-quality equipment. Again, a camera 402 producing HDTV quality video transmits at a relatively low data rate as a streaming source to a program editing facility 410 through a direct connection 412, enabling various operator controls including, but not limited to, frame-by-frame control, variable playback, forward/reverse (bi-directional) playback, and so forth. A decision list is generated on a scene-by-scene basis, with AVI file conversion being used for compatibility with PC non-linear editing. Alternative formats would include, for example, MPEG-4, Windows Media 9, or Divx (which even can be edited, utilizing one of the available software packages for editing. The source material and EDL (Edit Decision List) codes are stored in a streaming server, with the resulting modest requirements facilitating an hour of storage within a Gigabyte of memory (for SDTV at 2 Mbps) or within two Gigabytes of memory (for HDTV at 4 Mbps. The streaming video is output to one or more likely multiple viewing stations, utilizing an even lower data rate of, perhaps, less than two Mbps. Conventional SDTV signals utilizing a compressed DV-type output typically would be provided at 25-50 Mbps. HDTV-type signals utilizing a compressed SDI-type output would be provided at 100-300 Mbps; however, the signal manipulations within the system and before the output stages would utilize the more efficient and compact 4 Mbps files and signal streams.

Page 8, line 28 insert the following paragraph:

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This system application offers numerous features and advantages over a traditional system, which requires a more traditional recording and editing system 406, and which does not allow a direct connection via path 408. Using the approach described above, results in a dramatic reduction and system cost (under $10,000 vs. $100,000 or more at current prices). Full digital component processing (4:2:2) is achieved without a loss in quality, and excessive hard disk drives are not required for editing; rather, a generic PC is capable of editing the program (10 gigabytes vs. terabytes for traditional HDTV). The advantages includes a reduced HDTV production cost and time without a separate data capture step. The invention is not limited in term so video format or streaming, as all existing and yet to be developed formats may be accommodated.

Page 8, line 28 to page 9, line 5:

Figure 5 is a diagram which shows the way in which the instant invention implements HDTV quality video at a very low overall system cost. At the high end, an HDTV camera with a format 502 of 16:9 at 1920 x 1080 pixels uses some 2 million pixels per image as the source, which is reduced at 504 to less than 1 Megapixels or thereabouts due to interlace losses, bandwidth limiting, compression losses and so forth, resulting in an actual resolution of 70 percent of the original. Even so, equipment exhibiting this level of performance currently involves hardware costs of approximately $200,000.

Page 9, lines 6-11:

While broadcast quality video 508 (standard definition at 4:3) costs much less, the image quality is reduced dramatically, to a frame size of 720 x 480 pixels (4:3; 30 fps). According to the invention, however, utilizing a 24 fps scan and proprietary multi-format system at 506, [[an]] a 24P image at 1024 x 576 or 1280 x 720 can be generated having an aspect ratio of 16:9, exhibiting a quality comparable to conventional HDTV broadcast, but at a cost of under $10,000. A typical surveillance image, at 320 x 240 and <15fps is shown at 510 for comparison purposes.

Page 10, lines 15-28:

As shown in Figure 6, in Consumer-type applications, it is common to employ digital still camera systems, utilizing high-speed shutters to provide video program sourcing. For example, at a

resolution of 320 x 240 and <15 fps (4:3) the [[The]] results are limited to relatively low-quality recordings for relatively limited recording times. In addition, many artifacts are imparted to the recordings, such as motion artifacts and picture hesitation or jumps. Photo jpeg compression does not reproduce smooth motion, recording time is limited, and audio quality is poor.

However, consumer cameras are producing increasingly high quality recording, despite their small size and low cost. By employing the techniques disclosed herein, DV-quality recordings for more than one hour are practical, and S-VHS-quality recordings for more than two hours can be achieved. In addition, video editing is simplified, as no step of capturing to the PC is required -- editing can proceed directly from camera memory cards or other storage devices (including hard-disk, optical disc, DVD, *etc.*), and the quality is preserved throughout the process. In addition, the resulting recordings are compatible with various streaming conventions, such as those supported by Microsoft and Real Networks video. This same system of video processing without a step of capturing the signal to the PC applies equally as well to Professional and Camcorder applications.

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